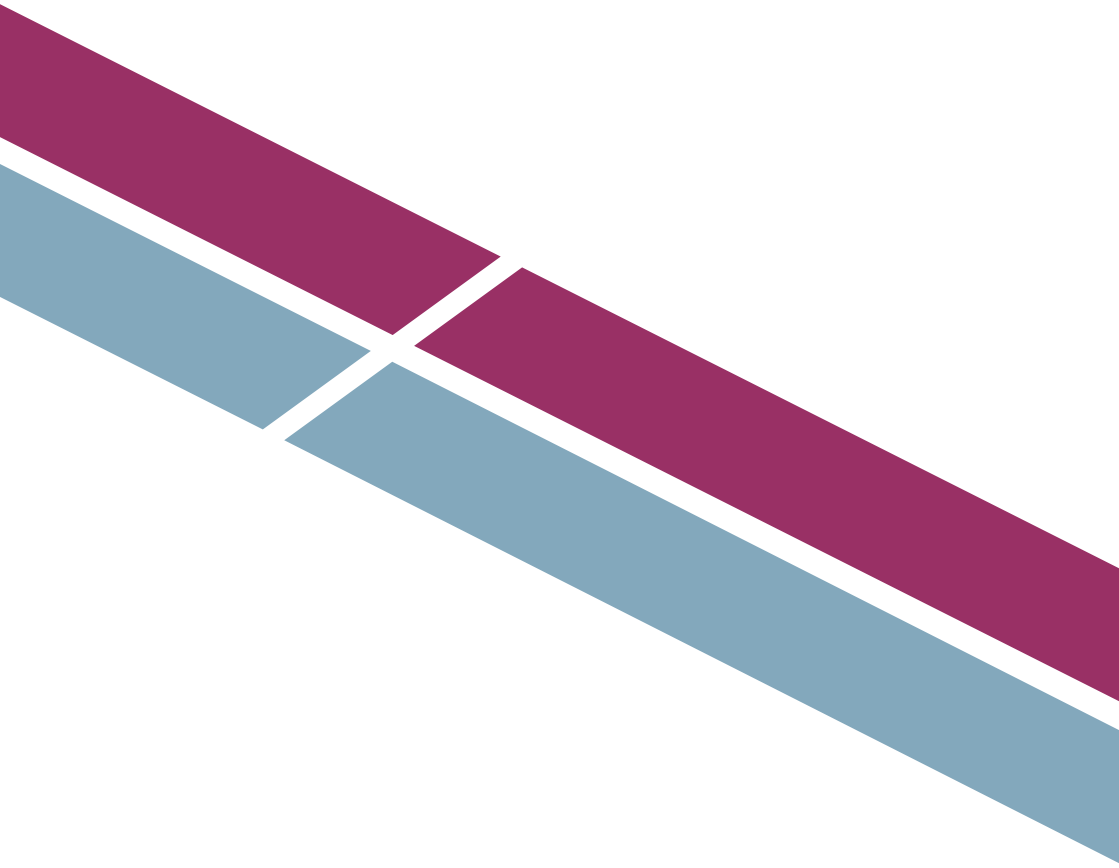
power to connect



reform scotland

power to connect

Ben Thomson
Geoff Mawdsley
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June 2009

About Reform Scotland

Reform Scotland is an independent, non-party think tank that aims to set out a better way to deliver increased economic prosperity and more effective public services based on the traditional Scottish principles of limited government, diversity and personal responsibility.

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Executive summary

Objective

This aim of this report is to set out how we could make a generational transformation of the transport network in Scotland by implementing strategic national projects which will benefit most of Scotland rather than projects which benefit particular parts of Scotland. Clearly this has major cost implications at a time when our economy is in recession and budgets are coming under increasing strain. However, we need to do this if we are not to be left behind in economic terms by other countries and there are advantages to starting at this time as construction costs will be low while such capital spending will provide a much-needed boost to the economy. In addition, the costs would be spread out over time. It is far more likely that a clear national strategy to improve the transport system will deliver long term benefits to the Scottish economy rather than various piecemeal developments.

Scotland has to decide if it really does aspire to achieve the objective set out in Reform Scotland's first report, 'Powers for Growth', which was to catch up with the leading economies in the world. If that is our aim, and it should be, then we must take the necessary steps to foster sustainable economic growth.

A transport system that maximises our potential for faster economic growth is an essential part of any successful economic strategy. It will not come cheap, but it is a genuine investment in the future prosperity of Scotland and everyone living in the country. It is essential that all the possible funding options are examined that would turn this vision into reality. This would include the additional borrowing powers that the Calman Commission proposed should be given to the Scottish Government as well as innovative examples from around the world as to how infrastructure projects can be funded which Reform Scotland will look at in a future report.

Based on our analysis of the current situation in Scotland and evidence from overseas on measures that have improved transport systems, Reform Scotland makes some recommendations as to the projects that would make the most difference to our economic growth potential. At the same time, the report examines whether, in the longer term, road pricing offers the potential to improve the efficiency of the transport network in Scotland.

Findings

- The significant investment in the transport system in Scotland over recent years has led to improvements to transport infrastructure in Scotland. Scottish Enterprise's survey of industry opinion from June 2008 recognised the improvements made to the transport network with over 70 per cent of respondents thinking that trunk road, rail and air services were very or fairly good in Scotland. However, less than a quarter thought services were 'very good' which shows there is still plenty of room for improvement.
- The importance of cities and city regions to economic growth has been recognised by the Scottish Government and its agencies since by concentrating economic activities cities and city regions enable greater economic specialisation and integration which promotes greater productivity. Reducing the journey times between the key cities in Scotland would increase the scale and reach of city regions and bring companies, their suppliers and their potential employees closer together. This would increase the potential for economic growth and that is why a number of other countries have made significant strategic investments in high speed links which have brought tangible economic benefits.
- The evidence from other countries, such as Singapore and Norway, is that road pricing schemes of different types can lead to better management of demand for road space, so reducing journey times and congestion on roads, increasing reliability and contributing to a more effective overall transport system.

Policy Recommendations

Central transport hub: We recommend that a central transport hub is created in Scotland around the airport at Ingliston which would be renamed Grand Central Airport to recognise its role in serving Scotland as a whole. The main railway station in Scotland would also be located here, called Grand Central Station, and, in addition, the trunk road network would be linked to this central hub. This would create the focal point within the central belt of Scotland for a properly integrated network of road, rail and air transportation which would aid the economy of Scotland as a whole.

In a perfect world, a completely new hub would be established equi-distant from Glasgow, Edinburgh and Stirling. However, because there is already an airport at Ingliston with the potential for growth and development our proposal is a more practical option. If journey times to this hub were no more than 20 minutes from Glasgow, Stirling and Edinburgh, it could perform the role as a national transport hub. Glasgow airport could not perform this role as it is sited on the west of the city, the wrong side for easy access to most of the rest of the country.

High speed rail links: We recommend that high speed rail links are created from Grand Central Station south to England and west, east and north to link Scotland's main cities of Glasgow, Edinburgh, Stirling, Perth, Dundee, Aberdeen and Inverness. Such an investment in new infrastructure, which would be done in stages, would dramatically reduce journey times and create the potential for a substantial increase in Scotland's trend rate of economic growth through greater integration of the economy. It is essential that high speed rail in Scotland links into the new high speed rail links proposed in England as this would increase access to key markets in other parts of the United Kingdom.

Figure 1 Costings for High Speed Rail Connections in Scotland

Stage	Destination from Grand Central Airport	Distance in kilometres	Estimated Cost
Stage 1	Glasgow and Edinburgh	77	£2.5 billion
Stage 2	Carlisle	188	£6 billion
Stage 3	Aberdeen (via Perth and Dundee)	206	£6.5 billion
Stage 4	Inverness (via Stirling)	233	£9 billion
Total		752	£24 billion

The average cost of high speed rail, according to Ernest Godward, a rail economist from consultants Scott Wilson, is about £30 million - £32 million per kilometre.[1]

1 Scottish Parliament. (2008) SPICe briefing; *High Speed Rail: Updated*. Edinburgh: Alan Rehfisch, Scottish Parliament. Available at: http://www.scottish.parliament.uk/business/research/briefings-08/SB08-43.pdf

Atkins, an engineering consultancy, published a study of the costs and benefits of two high-speed lines between London and Scotland along the East and West coasts. It found that the lines would cost £31 billion, but provide £63 billion in economic benefits, including helping the regeneration of northern cities.[2]

The cost benefit ratio for a full north/south high speed network is 1:2.0. This cost/benefit ratio compares favourably with major Scottish railway projects already approved by the Scottish Parliament, e.g. The Waverley Railway Line had a cost benefit ratio of 1:1.21.[3]

Improved trunk road network: We recommend that certain parts of the trunk road network in Scotland are improved to ensure that it links into the central transport hub that we propose and to reduce journey times by road between the main Scottish cities. This recognises the importance of good road links to the economy in Scotland.

Specifically, a ring road should be built around the central transport hub at Ingliston linking into the M8, M9 and Forth Road Bridge. In addition, there are currently plans to turn parts of the A9 between Perth and Inverness into a dual carriageway and the A96 from Aberdeen to Inverness is going to be upgraded with bypasses and overtaking opportunities. We would recommend that the A96 and A9 are upgraded to complete dual carriageways along their entire lengths as soon as possible.

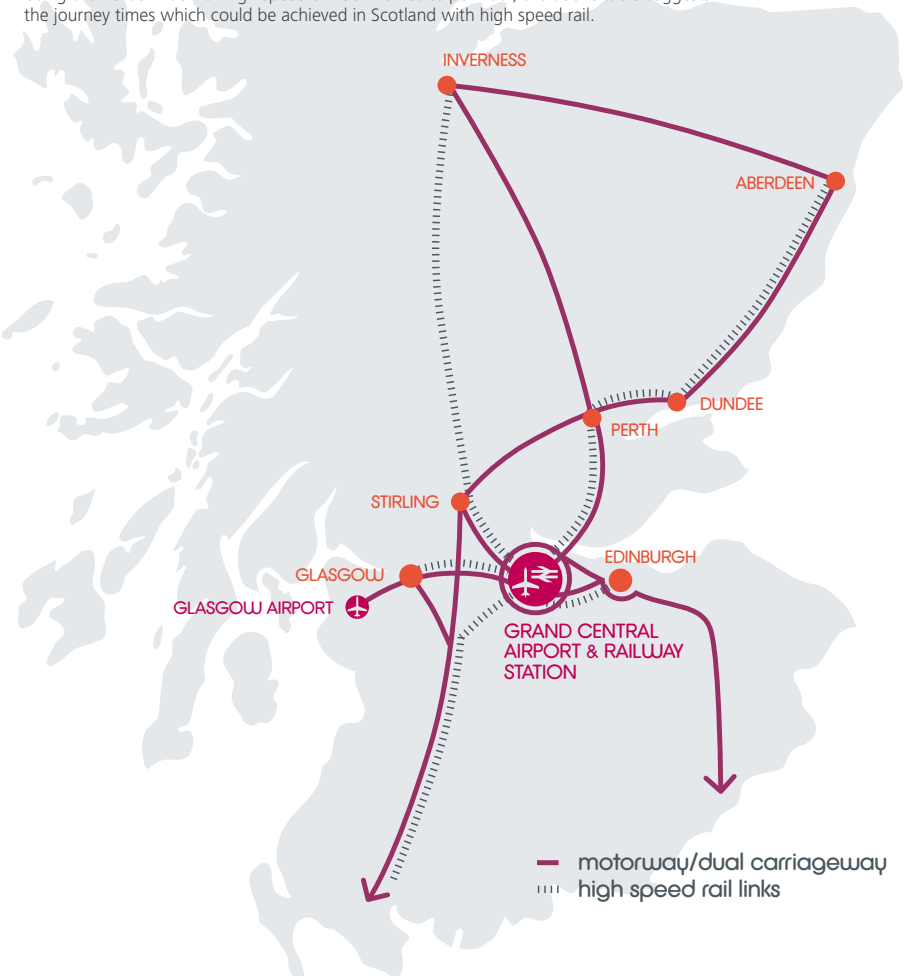
2 Webster, Ben. 'High-speed rail is not a green option, say ministers.' *Times Online* 6 June 2008: Online. http://business.timesonline.co.uk/tol/business/industry_sectors/transport/article4075781.ece

3 Scottish Parliament. (2008) SPICe briefing; *High Speed Rail: Updated.* Edinburgh: Alan Rehfisch, Scottish Parliament. Available at: http://www.scottish.parliament.uk/business/research/briefings-08/SB08-43.pdf

Figure 2 Proposed transport network in Scotland

Journey	Distance in kilometres	Estimated time
Grand Central Airport to Glasgow	64	15 min
Grand Central Airport to Edinburgh	13	5 min
Grand Central Airport to Perth	65	15 min
Perth to Dundee	35	9 min
Dundee to Aberdeen	106	25 min
Grand Central Airport to Stirling	48	12 min
Stirling to Inverness	233	56 min
Grand Central Airport to Carlisle	188	45 min

Using the EU definition of high speed of 250 kilometres per hour, the above table suggests the journey times which could be achieved in Scotland with high speed rail.



Road pricing: We recommend further investigation of how road pricing schemes might be implemented in Scotland. Evidence from other countries such as Singapore and Norway shows the part that road pricing systems can play in reducing journey times and congestion while improving reliability and having a positive impact on the environment. This justifies further investigation. By charging users directly for the use of road space and the costs they impose on others, road pricing has the potential to provide a more efficient and fair way of allocating road space and addressing the problem of congestion on our roads.

Road pricing schemes should not be seen as a way of paying for the strategic transport projects set out in this report. They are an entirely separate way of improving Scotland's future transportation system. It is also important to note that any Scotland-wide scheme would have to be an alternative to the existing methods of paying for roads through fuel and vehicle excise duties and not an additional means of raising revenue. To bring this about in Scotland, it would be necessary for the Scottish Parliament to have greater tax raising powers as recommended in Reform Scotland's earlier report, 'Fiscal Powers'.

Conclusion

The central insight of Reform Scotland's first report, 'Powers for Growth', was that governments did not have the necessary information and knowledge to control and direct an economy and that where such an approach had been tried it led to a misallocation of resources. However, governments have an essential role to play in creating the right framework within which people can create prosperity.

As is widely recognised, an efficient transport network is an essential component of the right framework for economic growth. This is because it integrates an economy and so creates the potential for faster growth.

It is Reform Scotland's view that we need to aim high in Scotland. The transport system in Scotland has improved, however we have not made the revolutionary changes seen in some other countries. The key as far as our transport system is concerned is to think far more strategically about how we improve the system in this country just as other countries have done. In achieving this national transport plan, we will need to review projects or potential projects to see

how they fit into the national strategy and take out or delay those that do not contribute to the overall objectives. The projects outlined in this report – a central transport hub connected through the airport to other countries and combined with faster rail and road links between our key cities and south to England – would have an enormous impact on the economic growth potential of Scotland as a whole and help to achieve the goal of sustainable economic development. In addition, both high speed rail and road pricing have the potential over time to reduce congestion on our roads helping business by reducing journey times and reliability as well as improving our environment.

Such thinking is in line with that of President Obama who said in a speech to Congressional leaders in Washington on April 16th 2009:

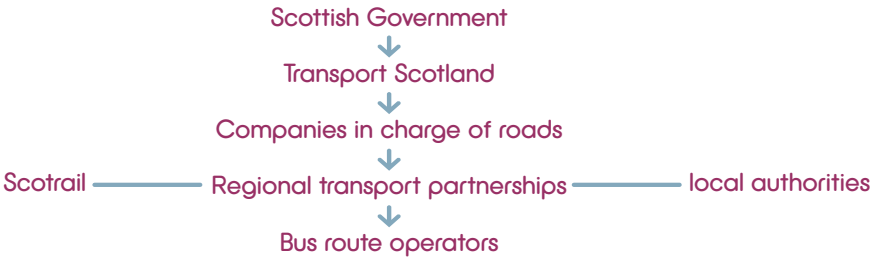
'But if we want to move from recovery to prosperity, then we have to do a little bit more. We also have to build a new foundation for our future growth. Today our ageing system of highways and byways, air routes and rail lines is hindering that growth. Our highways are clogged with traffic, costing us $80 billion a year in lost productivity and wasted fuel. Our airports are choked with increased loads. We're at the mercy of fluctuating gas prices all too often; we pump too many greenhouse gases into the air.

'What we need, then, is a smart transportation system equal to the needs of the 21st century. A system that reduces travel times and increases mobility. A system that reduces congestion and boosts productivity. A system that reduces destructive emissions and creates jobs. What we're talking about is a vision for high-speed rail in America.'

1. Transport in Scotland

1.1 Summary of transport in Scotland

Transport policy is largely devolved to the Scottish Parliament. The Scottish Government is in charge of road and rail services, but aviation is mostly controlled on a UK-wide basis. Transport Scotland, an executive agency of the Scottish Government, is in charge of the management of road, rail and concessionary travel in Scotland.

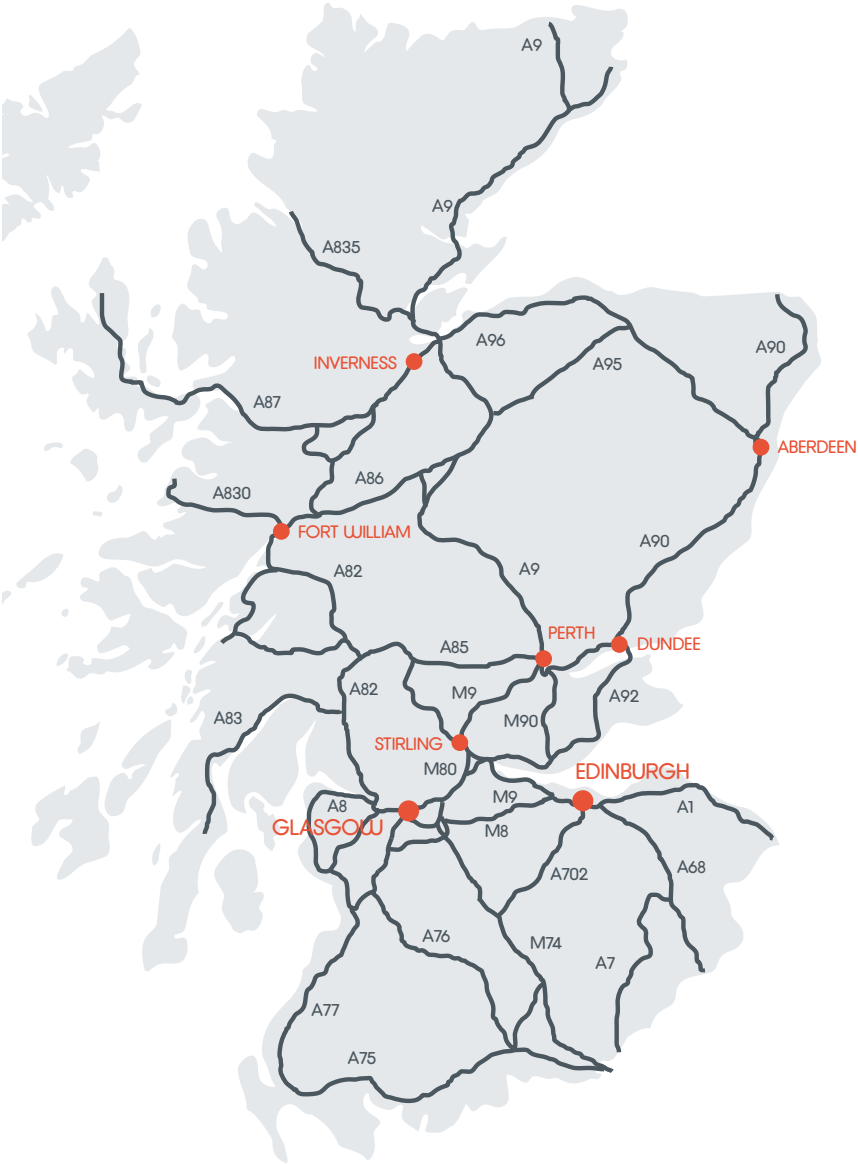


Transport Scotland started to operate on 1 January 2006 and is a National Agency of Scotland. It is an Executive Agency of the Scottish Government's Enterprise, Transport and Life Long Learning Directorate. Transport Scotland is responsible for helping to deliver the Scottish Government's nearly £3 billion per annum capital investment programme over the next decade. Its remit is to oversee the safe and efficient running of Scotland's trunk road and rail networks, establish and run a national concessionary travel scheme, deliver and run a number of major infrastructure projects, and specify and fund the Scottish rail network on behalf of Scottish Ministers.

- £3.2 billion on rail and tram services over the three years to 2010/11
- £3 million a year on travel information
- £240 million a year to support bus services and concessionary fares
- £9 million allocated to local authorities this year to promote cycling, walking and safer streets projects
- £91.4 million for ferries

Road

Figure 3 Trunk roads map in Scotland



The Scottish trunk road network is vital to the communication needs of the people and industry of Scotland. Out of a total of some 50 billion kilometres travelled on Scotland's roads annually, 30 billion are travelled on the motorway and trunk road network.[4] Scotland's trunk road network is managed by Transport Scotland. It has a value of £12.6 billion and Transport Scotland contracts private companies to manage and maintain the trunk road network. It is split into four areas: the North West, North East, South West and South East.[5]

Rail

The Scottish Government has almost total control over the operation of the railways in Scotland. It awards and monitors the ScotRail contract for the operation of the rail network; it has the power to direct strategic investment; and has the power to direct the work of Network Rail in Scotland. The rail franchise contract was awarded to First Group in 2004. Unlike other parts of the UK, this appears to allow for a higher degree of vertical integration of the railways because the whole of Scotland's network is operated by one company answerable to Transport Scotland, which does the strategic planning.[6]

Scotland's rail network has around 340 railway stations and 3,000 kilometres of track; over 81 million passenger journeys are made on the network each year.

The 2000 Transport Act created the Strategic Rail Authority (SRA) and in 2001 Railtrack was put into administration. In 2002, Network Rail acquired Railtrack Plc in order to run the railway infrastructure on a not-for-profit basis. Following the Railways Act 2005, Scottish Ministers have a new power to produce a long-term rail strategy.

4 Scottish Government. (2008) *Infrastructure Investment Plan 2008.* Edinburgh: Scottish Government. Available at: http://www.scotland.gov.uk/Publications/2008/03/28122237/0

5 The Scottish Office. (1998) *Strategic Review of the Trunk Road Programme in Scotland.* Edinburgh: Scottish Government. Available at: http://www.scotland.gov.uk/library/documents-w/strpis-00.htm

6 Transport Scotland. [Online] (April 2009). Road. Available at: http://www.transportscotland.gov.uk/road

The two main centres for rail services are Edinburgh and Glasgow, with 8,900 and 29,100 trips respectively during the 3-hour morning peak period. In addition to these trips, there is significant daily cross-border traffic along both the East and West Coast Main Lines. Much of this traffic is between Scotland and the north of England although there are small numbers to and from London and the south-west and south-east.

Rail supports economic success in Scotland by providing the cities (especially Glasgow and Edinburgh) with the labour required to fuel their competitiveness and their growing, service sector-based economies. The inter-urban passenger rail service between Edinburgh and Glasgow plays an important role in connecting the centres of these two cities. Rail also plays a crucial role in supporting Scotland's power and coal generation industries, as well as linking Scotland's economy to England, particularly by enabling the movement of high volumes of freight by rail.

Rail presently fulfils the following roles within the wider transport network in Scotland:

- supporting Edinburgh's economic success by enabling commuting into the city centre so linking the city's employers to sources of skilled labour across a wide catchment area;
- supporting Glasgow's economy by enabling significant levels of commuting into the city centre;
- providing an inter-urban rail service that links Edinburgh and Glasgow city centres thereby providing important economic and social connectivity between Scotland's two major cities;
- contributing to connecting the economies and societies of cities and regional centres such as Aberdeen, Inverness and Dundee to the Central Belt, although road currently makes a bigger contribution to fulfilling this role;
- linking Scotland's economy to England, through providing inter-urban passenger services and enabling the movement of large volumes of trainload and bulk freight by rail. The latter is especially critical for the Scottish opencast coal industry;

- providing a critical link in the supply chain for the Scottish power generation industry; and
- providing lifeline rail services to rural areas in the Highlands (including connections with lifeline ferry services to the Scottish Islands).

There are certain important markets that rail presently does not serve including those travelling to and from Scottish airports (with the notable exception of Prestwick Airport), the majority of those commuting into regional centres, a significant proportion of inter-urban travellers outside the Central Belt and time sensitive, cross-border travellers who presently use air travel to destinations in England and Wales south of the Yorkshire & Humber and North West English Regions.[7]

There are a number of operational constraints on the existing railway: issues typically include line speeds, track layout, restrictions due to signalling, the structure of the timetable and, in many parts of the country, numerous sections of single track line. Furthermore, 10 per cent of stations in Scotland generate 70 per cent of demand. Looking at journey times and considering interchange penalties, commuting by rail has journey time advantages; however, on longer distance inter-urban passenger journeys (except between Edinburgh and Glasgow) road is more attractive.

The present rail service is not adequate to support significantly greater utilisation. Rail interchange time is poor at certain points in the network, such as Inverness and Carlisle, increasing journey times to certain rural areas and there is generally poor integration with other modes of transport. For instance, car parking at stations is inadequate or the car parks themselves are full.

Aviation

Scotland's three main airports (Glasgow, Edinburgh and Aberdeen) are all owned by the private company, the British Airports Authority (BAA). Under competition rules, BAA has been ordered to sell either Glasgow or Edinburgh airport (although it is appealing against this ruling). Overall, regulation of aviation rests with the UK-wide Civil Aviation Authority (CAA).

7 Transport Scotland [Online] (April 2009). *Franchise Achievements.* Available at: http://www.transportscotland.gov.uk/rail/rail-franchise/franchise-achievements

There were 25.1 million air terminal passengers in Scotland in 2007, around 0.7 million (3 per cent) more than the previous year and the highest level ever recorded. There has been almost continuous growth from 1.2 million in 1960, with an increase in all but five of the years since then.

Low-cost airlines have contributed to the rapid growth in recent years. In 2007, more than half the passengers who used Scottish airports were travelling to or from other UK airports - principally London Heathrow (3.4 million), Gatwick (1.8 million), Stansted (1.3 million), Luton (1.1 million), Belfast (0.8 million) and Birmingham (0.9 million).[8]

Edinburgh Airport

Edinburgh airport, which we would like to see become a central transport hub for the whole of Scotland, has over 9 million passengers a year, and an average of 24,600 passengers a day. It currently employs 2,500 staff and recent investments include a new £11 million air traffic control tower, and £19 million south east pier extension. 2009 planned investments include a £40 million terminal extension, doubling the size of the departure lounge. The development will provide new state of the art security facilities and more relaxation space, including a wider choice of bars, shops and restaurants.[9]

1.2 Current plans to improve the Scottish transport system

Railway improvements

Transport Scotland points to significant improvements in the railways since First Group took over the ScotRail contract. In April 2004, the then Scottish Executive took on full funding responsibility for the rail franchise, which currently costs around £281 million per annum in subsidy. The contract is worth around £2.5 billon for the duration of the franchise (10 years).

8 Transport Scotland. [Online] (April 2009). Rail Projects. Available at: http://www.transportscotland.gov.uk/projects/rail-projects

9 Scottish Government. (2008) *Scottish Transport Statistics: No 27 – 2008 Edition*. Edinburgh: Scottish Government. Available at: http://www.scotland.gov.uk/Resource/Doc/255628/0075834.pdf

First ScotRail have also committed to delivering a £70 million programme of improvements for rail passengers across Scotland. This investment is in addition to the £40 million programme of improvements which First ScotRail committed to delivering upon taking ownership of the franchise.[10]

Waverley Railway Project

The Waverley Railway project is expected to re-establish a rail link to provide a passenger transport service from Edinburgh through Midlothian to Tweedbank in the Scottish Borders. Work is expected to start on site in 2011, with completion by the end of 2013. The estimated cost is between £235 million and £295 million.[11]

Glasgow Airport Rail Link (GARL)

On 29 November 2006, the Scottish Parliament gave the go-ahead for a new railway station as part of the Glasgow Airport Rail Link to Glasgow Central Station. The station and rail link are due to be completed in 2011. A new stretch of railway line of 1.9 kilometres in length will run from a junction on the Paisley to Gourock line out to the airport. Following the Office of Rail Regulation's recent Final Determination of Network Rail's costs for the period 2009-2014, the current estimated outturn cost range for the combined GARL-PCR project is £365.5 million - £395 million excluding VAT.

This figure cannot be compared to the original cost range for GARL as the project is now combined with a significant Network Rail signal renewal scheme, Paisley Corridor Rail (PCR), as outlined to Parliament by the Transport Minister on June 27, 2007.[12]

10 Edinburgh Airport. www.edinburghairport.com

11 Transport Scotland [Online] (April 2009). *Franchise Achievements.* Available at: http://www.transportscotland.gov.uk/rail/rail-franchise/franchise-achievements

12 Transport Scotland. [Online] (May 2009). Rail Projects. Available at: www.waverlyrailwayproject.co.uk

M74 Extension

The M74 Extension through the south side of Glasgow is due for completion by 2011. The construction cost is estimated at £575 million and it is Scotland's biggest roads project, and the first motorway to be built in a Scottish urban area for decades. The Scottish Government considers the M74 to be a vital link in the Central Scotland Motorway, and 'the scheme is one of the Scottish Government's top priority transport projects and will bring major benefits to the City of Glasgow and West Central Scotland, reducing journey times on roads, helping to alleviate congestion on the existing M8.'[13]

New Forth Crossing

In December 2007, following detailed submissions on the options available, the Scottish Government confirmed its intention to build a multi-modal, cable-stayed bridge to the west of the existing Forth Road Bridge. This development is set to be the largest construction project in the country in a generation and will create a new, modern landmark structure for Scotland. The estimated cost of the project is between £3.2 billion and £4.2 billion.

13 Scottish Government. (2008) Press Release.18 December 2008. Edinburgh: Scottish Government www.scotland.gov.uk/News/Releases/2008/12/18130927

2. The case for high speed links

2.1 High speed links

In its report, 'Economic Potential from High Speed Links Between Scotland's Cities', Scottish Enterprise points out the impact that high speed connectivity may have on economic development and regeneration in cities. The effectiveness of transport in increasing economic growth has in the past been associated with transportation costs and business location. However, recent improvements to the transport and information systems in the United Kingdom have driven transportation costs down to the point where firms are typically spending only 5 per cent of their total costs on transport, making transportation costs a small motivation for business location. Thus, the real benefit of high speed links comes from the increased mobility of people and the subsequent agglomeration, which is taken in economic theory to increase productivity and potential for economies of scope and scale, maximising regional competitive advantages and widening labour markets.

High speed rail is a catalyst for increasing regional economic growth, particularly in major cities. The direct impacts of high speed rail on economic growth are difficult to measure. This is due to the complexity of the various effects which depend on the economic structure of a given city, as well as precisely how that city is served by high speed rail. However, a study by Greengauge21 entitled 'High Speed Trains and the Development and Regeneration of Cities' has stated conclusively that high speed rail can be a major factor in the economic development and regeneration of cities. High speed rail can change travel patterns so that business travel and commuting is increased, shortening the travel time between major cities and allowing for a wider range of cities to gain from increased activity.

High speed rail offers the greatest potential benefits to the service sector of the economy and, therefore, those areas whose economies or development strategies are geared towards service sector businesses. Where high speed rail did not spur significant economic development in a region there was usually a lack of a service sector economy (or a lack of commitment to the development of a service sector economy). Regions with low frequency services also see little growth stemming from the development of a high speed line.[14]

Greengauge21 has also stated that benefits from the introduction of a high speed line into a region are enhanced by the integration of the local and regional transport networks with high speed rail stations as main connecting points for all types of transport. High speed rail also has to be able to serve the major points within a region and connect to the wider residential areas in the conurbation through local transport such as motorways and light rail systems, widening the labour market catchment area and increasing regional business potential. In order to achieve the rapid transport of people and increased economic activity, the local and regional transportation systems should merge at or close to the centre of economic activity in a region.

Several of the conclusions drawn by the Greengauge21 study on high speed rail connectivity are applicable to high speed link development in general. By bringing cities closer together in terms of travel time, any high speed link should generate higher levels of economic opportunity in the connected regions and widen the labour market catchment area. Development of high speed connection between cities has been effective in spurring economic growth in several major European countries, including Denmark, France and Spain.

14 Greengauge21. (2006) *High Speed Trains and the Development and Regeneration of Cities*. London: Greengauge21. Available at: http://www.greengauge21.net/assets/European_Regeneration_Experience.pdf

2.2 Denmark

In 2000, Denmark and Sweden opened the Oresund Bridge to rail and motor traffic. The Oresund Bridge is a ten mile bridge that connects the Oresund region of Denmark with the Skane region in Sweden. It provides the most direct connection between Copenhagen and Malmo, Sweden's third largest city, replacing an hour long ferry ride with a ten minute drive between the two regions. The bridge is used by high speed trains as well as cars. Trains leave frequently from Copenhagen and Malmo and are specially designed to shorten the journey time through fast acceleration, high top speeds and wide doors. The Oresund Bridge has effectively connected the two regions into a single, multinational conurbation of 3.5 million people. It now represents the largest, most densely populated area in Scandinavia, larger even than Oslo, Stockholm or Helsinki.

The bridge has allowed the two cities to more officially coordinate services and has encouraged increased economic activity in the region. It is argued that economies of scope and scale have been created within the area by increased cooperation and connectedness between Copenhagen and Malmo, which foster increased productivity in the region and make the most of competitive advantages. The connection of the cities has caused the Copenhagen-Malmo agglomeration to jump in the European rankings. Before 2000, Copenhagen was ranked 35 in terms of population; the addition of the bridge and the subsequent agglomeration of the Swedish population has caused the region to rise to 27 and become the largest in Scandinavia. Similarly, when agglomerated, the region became the fifth most "creative" metropolitan area in Europe in terms of the production of scientific output.[15] Because of the devolution of power to local governments that is a feature of Sweden and Denmark, the Zealand and Skane local authorities have been able to coordinate efficiently and effectively with each other in order to foster economic growth in the region.

15 Scottish Enterprise. (November 2007). *Economic Potential From High Speed Links between Scotland's Cities*. Edinburgh: Scottish Enterprise. http://www.scottish-enterprise.com/publications/economic_potential_from_high_speed_links_between_scotlands_cities.pdf page 43

The bridge has had a number of effects. In the 1990s, before the opening of the bridge, the number of cars crossing between Denmark and Sweden in Oresund hovered between 2 million and 3 million.[16] Immediately following the opening of the bridge that number jumped to almost 4.5 million and by 2005 had reached 7.4 million. The Oresund integration index, which measures business and commuter traffic on the Oresund Bridge every morning as a way to study business integration within the region, tripled between 2000 and 2005. The Scottish Enterprise study argues that the tripling has been caused by several factors:

- a growing number of firms with business activities on both sides of the bridge
- increased commuter traffic as people travel across the bridge by day to work
- changes in location patterns in which Skane has seen a 0.7 per cent population growth rate every year
- increased leisure travel between the two areas

The Oresund region has benefited from increased inward investment, particularly in research and development, business services, IT, telecoms, electronics and life sciences. There has been an increase in inward investment from 26 projects in 2000 to 76 projects in 2004, growing from approximately 27 per cent to 38 per cent of inward investment in Scandinavia, making the Oresund region the largest Scandinavian investment region.[17] The bridge has been a major factor in the development of the area over this period.

16 Ibid.

17 Copenhagen Monitor (August 2005) *Investment Update from the Copenhagen Community.* Produced by Copenhagen Capacity. Available at: http://www.scandinavianlogistics.com/media(2146,1033)/Monitor05-02-UK.pdf

2.3 France

Areas in France have benefited from development following the introduction of the TGV, the French high speed rail line. The TGV lines connect the major cities in France, bypassing towns and local networks. The TGV is environmentally sound and cuts journey times to bring major European cities closer. Examples of journey times are an hour and fifty five minutes for the 250 mile journey between Paris and Lyon and three hours for the 500 mile journey between Paris and Marseille. Since its opening in 1981, it has carried over 1.2 billion people, with 250,000 passengers riding every day. There are 20 TVG rail stations servicing 1,540 kilometres of tracks[18], with an additional 2,000 kilometres promised for 2020 with trains that can reach top commercial speeds of 320 kilometres per hour. There are developments taking place to allow access for other train types on the TGV lines, while TGV trains are able to use modified established routes, as well as the specially designed TGV lines, called LGV.[19]

In their report on high speed rail, Greengauge21 notes Lyon and Lille as prime examples of areas to benefit from economic stimulus stemming from the introduction of a high speed line. Lyon was one of the first major cities serviced by the TGV. Although most rail lines operating out of Lyon before the TGV went to the south end of the city, the TGV station was constructed in an emerging commercial area called Part-Dieu that was in a more convenient geographical area for commercial development than Old Lyon. The new station is called Lyon Part-Dieu and has become the centre for most rail traffic coming in and out of the city.

The area around Part-Dieu had been emerging as a commercial centre in Lyon and the advent of the TGV station in the area further increased development as businesses moved to take advantage of the access to high speed rail services. Lyon has taken measures to align regional transportation networks with the TGV station in Lyon, making the station and the district around the station easily accessible from the Lyon metropolitan area, as well as taking measures to expand TGV access between Lyon and other major cities, helping to maximize the impact of the TGV on growth. While Lyon was already an

18 France Diplomatie: Transports [Online] (June 2009). Available at: http://www.diplomatie.gouv.fr/en/france_159/economy_6815/transports_6834/the-east-europe-high-speed-train-line-the-first-section-has-opened_8921.html

19 TGV High Speed Rail Network. France. Available at: http://www.railway-technology.com/projects/frenchtgv/

important commercial city in France, the development of the TVG rail has expanded its service sector as tourism and hotels near the TGV station have increased in number as well as extensive business relocation to the area.

Before the TGV was introduced, Lille was largely an industrial city with a focus on manufacturing which had started to see a reduction in economic activity due to cheap imports. The introduction of the high speed rail line to the city was accompanied by a switch in the city's focus towards developing a stronger service sector. The TGV Nord line was brought into the city, which saw itself as a hub between three major European capitals – Paris, London and Brussels. Its position and the TGV line have allowed for extensive service business growth, which has also been the goal of a continuing economic strategy for the region.

In order to accommodate the TGV line, the city built a new station for national and international destinations, Lille Europe, which serves 15,000 people per day. It also maintained its old rail station, Lille Flandres, which serves the surrounding region and carries 60,000 passengers per day. Relocation of hotels, universities, offices and event halls to the area around Lille Europe (the TGV station) has helped the service sector grow in a city that was falling behind in manufacturing, which in turn has stimulated growth in smaller towns in the rest of the area. In 2004, Lille was designated the European Capital of Culture.

Both Lyon and Lille have benefited from economic growth associated with the introduction of high speed links to other major European cities. This has come through the development of the service sector and the strategic geographic placement of the high speed line station, though the exact amount of growth stemming directly from the TVG line is difficult to quantify exactly. The TGV is widely considered to be highly successful, with the reduction in travel time and lower costs making it a viable competitor with air transit, which has seen a decline where TGV networks have been introduced.[20]

20 Ibid.

2.4 Spain

Spain has invested heavily in high speed links. It opened its first high speed rail (AVE) line from Madrid to Seville, in Andalucía, in 1992 and has spent a total of 100 billion Euros on developing the network. The success of the AVE has spurred political competition to have stations built with ambitious plans to have 90 per cent of the population living within 50 kilometres of a high speed rail station by 2020.[21] The high speed trains are operated by the state owned company RENFE. Since the opening of the high speed rail, the number of passengers travelling by train to Seville has risen from 13 per cent in 1991 to 50 per cent in 2003,[22] while the percentages of passengers using cars and aeroplanes have declined.

Air transit within all of Spain has declined since the introduction of the high speed rail network as a direct competitor – Iberia is set to cut flights by 7 per cent this year.[23] The price of air and rail travel is comparable, however trains are more accessible than planes and the AVE guarantees that its passengers will arrive within five minutes of the scheduled time, giving people a real incentive to choose train over air travel. Proponents of the AVE network look to the success of the corridor between Madrid and Barcelona which has been able to capture approximately half of the air traffic along the route with comparable prices, times and efficiency.[24] Passenger revenues on the line cover both maintenance and service costs and the network centres around Madrid as a hub.

Seville, as the first city to be serviced by the AVE from Madrid, has seen significant development both of the city and region and the AVE network. Because of its competitive pricing policy which has kept prices low in order to maintain a high demand, the Seville corridor has served as a useful model for popularizing other AVE connections.

21 Catan, Thomas.*'Spain's Bullet Train Changes Nation -- and Fast*.' Wall Street Journal 20 April 2009: Online. http://online.wsj.com/article/SB124018395386633143.html

22 Scottish Enterprise. (November 2007). E*conomic Potential From High Speed Links between Scotland's Cities.* Edinburgh: Scottish Enterprise. http://www.scottish-enterprise.com/publications/economic_potential_from_high_speed_links_between_scotlands_cities.pdf page 43

23 The Economist staff, 'Ave Madrid.' *The Economist* 5 February 2009: Online. http://www.economist.com/world/europe/displaystory.cfm?story_id=13061961

24 Catan, Thomas. *'Spain's Bullet Train Changes Nation -- and Fast.'* Wall Street Journal 20 April 2009: Online. http://online.wsj.com/article/SB124018395386633143.html

Before the opening of the AVE line, Seville was going into a deep economic downturn in 1990 and 1991. Since the line opened, it has seen growth and inward investment. Most notably, the decision by Airbus to locate their assembly, testing and delivery facility for the A400M in the area, providing up to 3,500 jobs for the region, is seen as having been influenced by the availability of the high speed link. Seville has also seen an increase in tourism and a rise in day long business trips between itself and Madrid.[25]

Ciudad Real, which is on the Seville-Madrid AVE line one hour from Madrid has seen large population growth as well as a trebling in real estate prices and increased commuter traffic on the trains as people and firms increasingly see the city as a viable part of the Madrid conurbation.[26]

Though the AVE is costly, the network brings social as well as economic benefits such as a reduction in greenhouse gas emissions due to less air travel, a reduction in congestion as well as greater mobility and social integration.

2.5 Costs and benefits

The costs of building high speed rail have varied across Europe. According to a SPICe briefing on high speed rail, the cost of construction for the AVE was approximately 10 million Euros per kilometres, while the UK Channel Tunnel Rail Link was as high as 71 million Euros per kilometre. The difference in cost was attributed, amongst other reasons, to high land and labour costs, stricter safety and environmental regulations and inflated UK railway costs.[27]

There are also environmental concerns, mainly focussed on the land used, but that also include noise pollution and secondary pollution from the use of electricity, and negative impacts on wildlife and the environment.[28] A train needs 90 per cent more energy to travel at speeds of 350 kilometres per hour than the current maximum speed in the UK of 200 kilometres per hour, leading

25 Scottish Enterprise. (November 2007). *Economic Potential From High Speed Links between Scotland's Cities.* Edinburgh: Scottish Enterprise. http://www.scottish-enterprise.com/publications/economic_potential_from_high_speed_links_between_scotlands_cities.pdf page 43

26 Ibid.

27 Scottish Parliament. (2008) SPICe briefing; *High Speed Rail: Updated.* Edinburgh: Alan Rehfisch, page 5. Scottish Parliament. Available at: http://www.scottish.parliament.uk/business/research/briefings-08/SB08-43.pdf

28 Scottish Parliament. (2008) SPICe briefing; *High Speed Rail: Updated.* Edinburgh: Alan Rehfisch, page 6. Scottish Parliament. Available at: http://www.scottish.parliament.uk/business/research/briefings-08/SB08-43.pdf

to an increase from 50 grammes per kilometre of carbon dioxide produced to 90 grammes.[29] However, high speed trains often compete directly with air travel, which produces 225 grammes of carbon dioxide per kilometre.

In a Commission for Integrated Transport report published in 2004, it was stated that 'the existence of very good conventional rail lines reduces the incremental economic case for high speed rail, particularly over shorter distances, although if it is possible to use existing railway lines on final approaches to major cities, the construction costs of high speed rail can be significantly reduced'.[30]

The economic benefits of building high speed rail outweigh the costs two to one according to a study published by Atkins, an engineering consultancy. The study looks at a north-south high speed rail network connecting London with Edinburgh and Glasgow. The study found that although the costs would reach about £31 billion, the economic benefit created could reach as much as £63 billion, with a benefit cost ratio (BCR) of about 1:2.0. The BCR of constructing just a high speed rail link on the West Coast Main Line generates a BCR of 1:1.7, which is still significantly higher than a conventional speed West Coast Main Line, which has a BCR of 1:07.[31]

The BCR for the total network of 1:2.0 is higher than Scottish rail projects which have already been approved such as the Waverley Line. This has a BCR of 1:1.21.[32] As has been found in relation to other projects such as London Underground's Jubilee Line Extension, which is now seen as a success, traditional measures of costs and benefits fail to take into account the agglomeration benefits i.e the improved efficiency and competitiveness gained by connecting people better to each other. It is these benefits which high speed rail will deliver in Scotland so increasing the potential for economic growth.

29 Webster, Ben. 'High-speed rail is not a green option, say ministers.' *Times Online* 6 June 2008: Online. http://business.timesonline.co.uk/tol/business/industry_sectors/transport/article4075781.ece

30 Steer Davies Gleave (February 2004) *High Speed Rail: International Comparisons.* Prepared for Commission for Integrated Transport. Available at: http://www.cfit.gov.uk/docs/2004/hsr/research/pdf/exec.pdf

31 Atkins. (March 2008). *Because Transport Matters; High Speed Rail.* London: Atkins. Available at: http://www.atkinsglobal.com/Images/Because%20Transport%20Matters%20Report%20(email)_tcm12-2232.pdf

32 Scottish Parliament. (2008) SPICe briefing; *High Speed Rail: Updated.* Edinburgh: Alan Rehfisch. Scottish Parliament. Available at: http://www.scottish.parliament.uk/business/research/briefings-08/SB08-43.pdf

3. Further lessons from other countries

3.1 Road pricing

Road pricing as a term refers to any form of direct charging for using roads and can take a variety of forms. For example, tolls to pay for the use of specific roads, bridges or tunnels; cordon charges to enter specific areas of a city or town; and congestion pricing which charges motorists for use of congested roads and can vary according to time of day or levels of congestion.

Directly and indirectly, road pricing can lead to the relief of congestion; shorter and more reliable journey times; reduced air pollution; improvements in alternative transport services and the speeding up of programmes to expand transport network capacity. Of course, the realisation of these benefits depends on the type of scheme implemented and it is worth looking at some of the international examples of road pricing in its different forms.

3.2 Singapore

Singapore introduced the first urban road pricing scheme in June 1975 as a means of controlling levels of traffic within the city. In common with most international examples of road pricing, it was a cordon tolling scheme in which a fee is charged to enter or drive within a particular area, normally the centre of a city. The system in place in Singapore charges for all journeys within the cordon rather than just when the cordon is crossed.

Initially, the Singapore scheme required drivers to purchase a licence to drive within the cordon area during the morning which was the peak period. Over time, the charges were increased and extended to include the afternoon period with exemptions for certain vehicles such as motorcycles, trucks and taxis removed. Roads outside the cordon were also brought into the scheme to mitigate the adverse effects on such roads. From 1995 onwards, Singapore moved to an electronic system of road pricing based on units within vehicles and payment by smart cards. This required the introduction of cameras and equipment to read licence plates.

The system has evolved to one which seeks to control congestion through a desired travel speed on the designated roads. Charges are flexible depending on type of vehicle, day, time and place with the fees varied every three months depending on whether travel speeds are higher or lower than the desired level.

Road pricing is an important part of Singapore's transportation strategy, which aims to reduce the use of motor vehicles, and proceeds from the scheme have been used to develop transit systems including a Mass Rapid Transit heavy rail system opened in 1988 and a light rail network set up in 1999.

The effects of the road pricing system in Singapore were felt immediately with a reduction of 73 per cent in the number of private cars crossing the cordon, an increase of 30 per cent in car pooling and the use of buses doubling. Despite increases in income and ownership of cars, the system has meant that congestion is still 31 per cent lower than it was before the scheme was introduced.

According to the study conducted in 2007 by M.H. Schuitema, 'Road Pricing as a Solution to the Harms of Traffic Congestion', revenues at around 40 million - 50 million Euros per annum exceed the yearly operating costs of around 8 million Euros.

3.3 Norway

Along with Singapore, Norway has been one of the leaders in urban road pricing schemes which have operated in the cities of Bergen, Oslo and Trondheim. These were all cordon tolling schemes based on tolling rings around the respective cities initially with manual stations to collect the tolls. As in Singapore, this gave way to greater use of electronic systems for collecting tolls. Bergen has gone the furthest in this respect with a fully automated system in place using cameras which record all vehicle licence plates. People have various options in paying the tolls including paying at petrol stations or receiving a bill through the post if they don't have a transponder. The electronic system in Bergen has reduced operating costs by 40 per cent - 50 per cent increasing the funding available for improvements to the transport system.

The main justification for the tolling schemes in Norway was to raise revenue for new road investment and other transport improvements which would in turn reduce congestion. To make this explicit, the charges had a limited timescale in Oslo and Trondheim. All of this was to overcome public concerns about the new charges because it was felt that the public would not accept charges designed merely to manage demand for road space. The impact on traffic levels has, therefore, been less than in Singapore. For example, in Bergen there has been only a 6 per cent - 7 per cent decrease in traffic levels and in Oslo only a 3 per cent - 4 per cent reduction in traffic.

Revenues from the schemes in Norway have been substantial since, following the introduction of electronic systems, collection costs were reduced to around 10 per cent of total revenues in all three cities. Initial fears that the scheme would harm the city centres in all three places have also been overcome since the implementation of these schemes as people and businesses have seen the benefits of increased mobility and reduced congestion.

3.4 London

A central area congestion scheme was implemented in London in February 2003. Initially a daily charge of £5 to travel within central London on weekdays between 7am and 6.30pm was implemented. The daily rate went up to £8 in July 2005 and the scheme was extended into parts of West London in 2007. Enforcement of the charge is through cameras at entry points to the central city which record licence plates and match them to payments made. These payments can be made in a number of ways including by phone, mail, internet or at shops or petrol stations.

The main disadvantage of the scheme is that it charges the same amount however much a vehicle travels within the centre of the city. Therefore, it discourages initial entry into the cordon zone, but does not discourage further travel within the zone. Another problem has been the failure to catch those who don't pay the charge due to issues with the cameras and equipment to read licence plates. This reduces the potential of the scheme to raise revenue and manage congestion compared to an electronic system with units in vehicles, however it did make the system much easier to implement.

According to Transport for London, which runs the scheme, initially it resulted in a drop in congestion of 20 per cent - 30 per cent and the overall amount of traffic fell by 21 per cent between 2002 and 2006. This has resulted in 70,000 fewer vehicles being on the streets compared with before the charge was introduced. At the same time, there are 13 per cent more taxis, the number of buses and coaches has risen by 25 per cent and bicycles by 49 per cent.

More recently, there has been a rise in congestion although Transport for London claims this has been due to an increase in street works and that if traffic volumes had been at pre-congestion charge levels then the problem would have been significantly worse. The scheme brings in a net annual income for Transport for London of around £90 million which must be reinvested in public transport. Whilst this is not as much as the early claims that £130 million a year could be raised it has provided a significant boost for the system.

The most controversial aspect of the congestion charge in London has been its effect upon business. The London Chamber of Commerce claims it has had a detrimental effect on retailers, while Transport for London claims that the effect has been broadly neutral.

3.5 Toll roads

As well as schemes charging tolls to enter cities or city centres, there are numerous examples of tolls being charged on specific roads. For example, toll roads have been in existence for over fifty years with the tolls funding the construction, maintenance and operation of road infrastructure. The Autoroute A1 in Northern France took this idea further with the tolls varying so that they were higher during peak periods than non-peak periods. This uses the tolls as a means of managing congestion and it has been successful in spreading journeys out to reduce the delays experienced by drivers.

In the UK, the M6 Toll is Britain's first tolled motorway built through a Design Build Finance and Operate contract between the Highways Agency and Midland Express Limited. It has provided an alternative to the M6 in the West Midlands reducing congestion on that road and offering journey times between 4 and 18 minutes quicker at peak periods. It has also had a beneficial effect on safety on the original M6 with accidents involving death or serious injury down by more than half since the late 1990s.

Similar reductions in journey times occurred on the Chicago Skyway which offers a tolled alternative to severely congested roads around Chicago. It has resulted in average time savings of around 22 minutes, sometimes rising to 35 minutes. California has also introduced High-Occupancy Toll lanes on roads in Orange County and San Diego. These roads allow drivers to use the lane if they share a car or, if they are solo drivers, pay a charge. Again, it has led to much reduced journey times.

3.6 Conclusion

The evidence from road pricing in other countries shows that it offers benefits in terms of reduced congestion and increased revenue. Managed properly, negative effects on nearby roads can be avoided and it does not necessarily damage businesses. The reduction in congestion will have a positive impact on businesses because it means faster journey times and improved reliability.

There is certainly sufficient evidence to warrant further investigation of how road pricing could be integrated into an effective transport system in Scotland. The UK Government believes that a national road pricing scheme offers potential benefits. The Department for Transport's feasibility study of road pricing in the UK claimed such a scheme could deliver £10 billion worth of time savings a year. Further, 20 per cent of peak hours' traffic could change either the mode or the time of travel and 71 per cent of cars and vans during the morning rush hour have only one occupant, so there is the potential for these benefits to be realised in the UK.

The UK Government, on the advice of experts, has claimed that the technology to deliver an effective national system based on global positioning and boxes in cars will not be available before 2014. However, a more serious problem to overcome is the public's opposition to the concept of road pricing largely borne out of the belief it is just an additional form of taxation. The experience in Edinburgh when a congestion charging scheme was rejected in a referendum and the more recent referendum in Manchester when a similar scheme was rejected by a margin of nearly four to one demonstrates the difficulty of persuading people of the merits of road pricing. The difficulty faced by these local schemes was that they could only offer theoretical benefits whereas experience from other countries shows that people are more positive when they can see the benefits delivered by a real scheme. Such local schemes also cannot offer the offsetting tax reductions

that show that this is a different and more effective way of paying for road transportation, not an additional tax.

As in the UK as a whole, there is no prospect of a national road pricing scheme in Scotland in the near future. To make it feasible, it requires not only the necessary technology to come on stream, but also the Scottish Parliament to be given far greater fiscal powers. For example, the Scottish Parliament would need to have control over fuel and vehicle excise duty. This would enable these taxes to be reduced when road pricing was introduced.

The option of introducing road pricing should certainly be kept open as it offers enormous potential benefits to Scotland in terms of efficient use of road space, reduced congestion and the associated benefits to our environment. In particular, it offers the prospect of a fairer deal for Scotland's rural communities currently charged high levels of fuel duty for using roads which are not congested and when the car is often the only option as public transport alternatives don't exist. Road pricing would mean that people using roads in rural Scotland would pay far less than at present.

4. How to improve Scotland's transport system

Improvements to the transport system in Scotland have taken place over a number of decades and this is recognised by those who use the transport system, particularly businesses that rely on it on a day-to-day basis. However, according to the Scottish Enterprise survey of industry attitudes conducted in June 2008, not many regard our transport system as 'very good'. If we aspire to match the leading world economies then we need a world class transport system and we fall short of other countries in this respect.

The evidence in this report shows that many other countries have put in place truly transformational transport developments that have shrunk journey times and integrated their economies. It is this lead that we need to follow. Too often, we have implemented worthy, local schemes without taking into account the broader needs of the Scottish economy. The proposals set out in this report are an attempt to rectify this and to focus on the strategic transportation needs of Scotland as a whole.

Central transport hub

A more fully integrated transport system in Scotland requires a central transport hub. The best location for this is around the airport at Ingliston which should be renamed Grand Central Airport to recognise its role serving Scotland as a whole. The main railway station in Scotland would also be located here, called Grand Central Station, and, in addition, the trunk road network would be linked to this central hub. This would create the focal point for a properly integrated network of road, rail and air transportation in Scotland which would aid the economy of Scotland as a whole.

In a perfect world, a completely new hub would be established in central Scotland equi-distant from Glasgow, Edinburgh and Stirling. However, because there is already an airport at Ingliston with the potential for growth and development our proposal is a more practical option. If journey times to this hub were no more than 20 minutes from Glasgow, Stirling and Edinburgh, it could perform the role as a national transport hub. Glasgow airport could not perform this role as it is sited on the west of the city, the wrong side for easy access to most of the rest of the country.

High speed rail links

To build on the central strategic transport hub in Scotland, high speed rail links should be created from Grand Central Station south to England and west, east and north to link Scotland's main cities of Glasgow, Edinburgh, Stirling, Perth, Dundee, Aberdeen and Inverness. Such an investment, which would be done in stages, would dramatically reduce journey times and create the potential for a substantial increase in Scotland's trend rate of economic growth through greater integration of the economy. It is essential that high speed rail in Scotland links into the new high speed rail links proposed in England as this would increase access to key markets in other parts of the United Kingdom.

Figure 4 Costings for High Speed Rail Connections in Scotland

Stage	Destination from Grand Central Airport	Distance in kilometres	Estimated Cost
Stage 1	Glasgow and Edinburgh	77	£2.5 billion
Stage 2	Carlisle	188	£6 billion
Stage 3	Aberdeen (via Perth and Dundee)	206	£6.5 billion
Stage 4	Inverness (via Stirling)	233	£9 billion
Total		752	£24 billion

The average cost of high speed rail, according to Ernest Godward, a rail economist from consultants Scott Wilson, was about £30 million - £32 million per kilometre.[33]

Atkins, an engineering consultancy, published a study of the costs and benefits of two high-speed lines between London and Scotland along the East and West coasts. It found that the lines would cost £31 billion, but provide £63 billion in economic benefits, including helping the regeneration of northern cities.[34]

33 Ibid.

34 Webster, Ben.'High-speed rail is not a green option, say ministers.' *Times Online* 6 June 2008: Online. http://business.timesonline.co.uk/tol/business/industry_sectors/transport/article4075781.ece

The cost benefit ratio for a full north/south high speed network is 1:2.0. This cost/benefit ratio compares favourably with major Scottish railway projects already approved by the Scottish Parliament, e.g. The Waverley Railway Line had a cost benefit ratio of 1:1.21.[35]

Improved trunk road network

Certain parts of the trunk road network in Scotland are in need of improvement to ensure that the trunk road network links into the central transport hub that we propose and to reduce journey times by road between the main Scottish cities. This recognises the importance of good road links to the economy in Scotland.

Specifically, a ring road should be built around the central transport hub at Ingliston linking into the M8, M9 and Forth Road Bridge.

In addition, two roads which are in need of improvement are the A96 and A9. The A96 is approximately 177 kilometres of slow-moving traffic between Scotland's two rapidly expanding cities in the North. It has a dual carriageway between Aberdeen and Inverurie with nine roundabouts, then single carriageway most of the way to Inverness. It is generally accepted that one can now drive from Aberdeen to Glasgow, city boundary to city boundary, in the time it takes to cover the much shorter A96. The A96 is constantly busy, carrying a huge volume of commuters and heavy vehicles to the various big towns and two cities, and has a poor safety record at numerous points along its length.

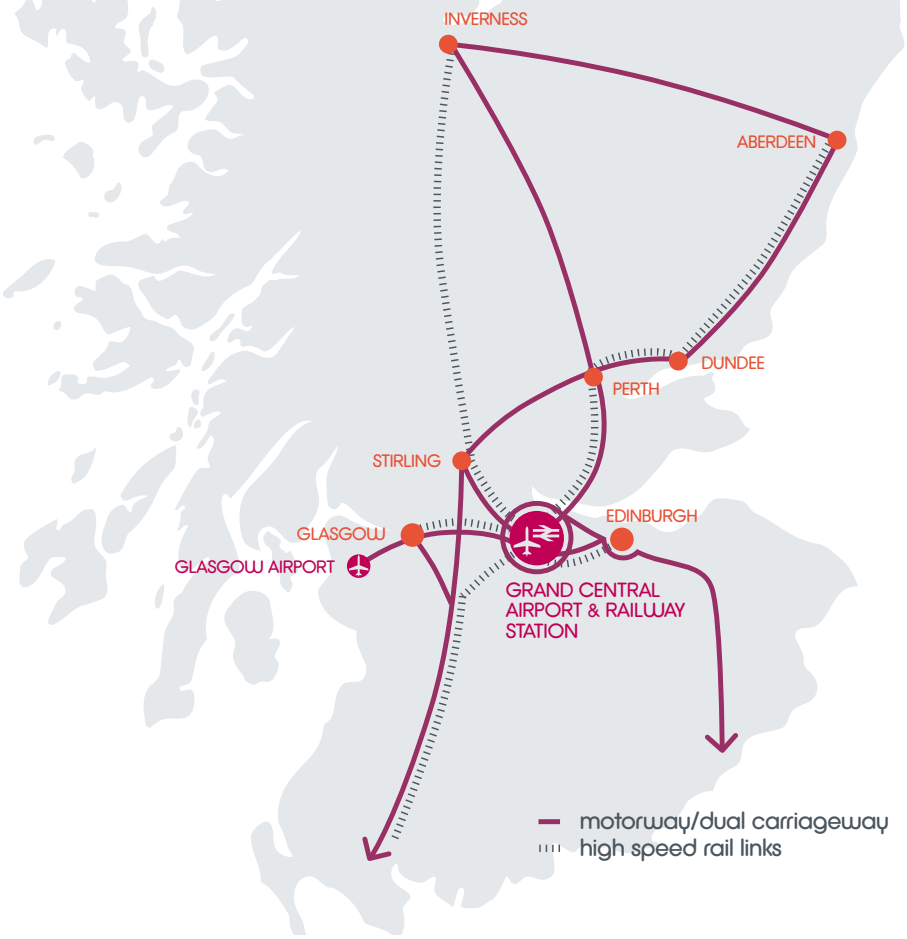
There are currently plans to upgrade part of the A9 between Perth and Inverness to dual carriageway and the A96 from Aberdeen to Inverness is going to be upgraded with bypasses and overtaking opportunities. Both the A96 and A9 should be upgraded to complete dual carriageways along their entire lengths as soon as possible.

35 Scottish Parliament. (2008) SPICe briefing; *High Speed Rail: Updated*. Edinburgh: Alan Rehfisch. Scottish Parliament. Available at: http://www.scottish.parliament.uk/business/research/briefings-08/SB08-43.pdf

Figure 5 Proposed transport network in Scotland

Journey	Distance in kilometres	Estimated time
Grand Central Airport to Glasgow	64	15 min
Grand Central Airport to Edinburgh	13	5 min
Grand Central Airport to Perth	65	15 min
Perth to Dundee	35	9 min
Dundee to Aberdeen	106	25 min
Grand Central Airport to Stirling	48	12 min
Stirling to Inverness	233	56 min
Grand Central Airport to Carlisle	188	45 min

Using the EU definition of high speed of 250 kilometres per hour, the above table suggests the journey times which could be achieved in Scotland with high speed rail.



Funding

To fund the projects described above will require substantial additional funding. Public funding will be limited in the years ahead, although if the Calman Commission's proposals are implemented then the Scottish Government will be given additional borrowing powers. These additional borrowing powers are required to fund exactly this sort of capital investment.

However, we need to examine other imaginative ways of funding such infrastructure projects. There are numerous innovative examples of how this has been done in other countries. All these options must be explored and Reform Scotland will look at this in more detail in a future report.

Road pricing

Evidence from other countries such as Singapore and Norway shows the part that road pricing systems can play in reducing congestion. This justifies further investigation of how road pricing schemes might be implemented in Scotland. By charging users directly for the use of road space and the costs they impose on others, road pricing has the potential to provide a more efficient way of allocating road space and addressing the problem of congestion on our roads.

Road pricing schemes should not be seen as a way of paying for the strategic transport projects set out in this report. They are an entirely separate way of improving Scotland's future transportation system. It is also important to note that any Scotland-wide scheme would have to be an alternative to the existing methods of paying for roads through fuel and vehicle excise duties and not an additional means of raising revenue. To bring this about in Scotland, it would be necessary for the Scottish Parliament to have greater tax raising powers as recommended in Reform Scotland's earlier report, 'Fiscal Powers'.

5. Conclusion

Reform Scotland believes that the recommendations set out in this report offer a blueprint for a transformed transportation system in Scotland enabling us to catch up with other European countries such as France and Spain which have already made bold investments in new high speed rail.

Further, this strategic investment in transport infrastructure should be a central component of an economic strategy in Scotland for future prosperity. As Lord Adonis, the UK Government's new Secretary of State for Transport said in a speech he gave at the Arup Campus, Solihull on 21st May 2009 entitled 'High Speed Rail – Reflections on an International Transport Revolution':

'Furthermore, my instinctive view as an historian is that high speed rail could be a revolutionary change, like the original railways of Stephenson and Brunel: not only a piece of new transport infrastructure, but a bold economic policy for jobs and growth, a bold industrial policy to drive high-tech engineering and innovation'.

That is exactly the vision that Scotland requires. We just need the political will to turn the vision into reality.

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